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METHOD FOR MANUFACTURING ANTIBACTERIAL FILTER MATERIAL

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Abstract

Constitution

A method for manufacturing an antibacterial filter material characterized by the fact that it dips a filter material into a treating liquid, which is constituted by dispersing an antibacterial component composed of zinc oxide with a particle diameter of 0.05 μm or less into an aqueous solution of an aqueous emulsion resin, and fixes the antibacterial component on the surface of the filter material by drying.

Effect

An antibacterial filter material with antibacterial performance superior to that of conventional materials can be obtained by manufacturing the filter material of the present invention. Also, the antibacterial filter material has antibacterial property even after washing with water in addition to the antibacterial property during general filtration, can be reused in terms of application such as air filter utilization, and is also economically excellent.

Claims

1. A method for manufacturing an antibacterial filter material characterized by the fact that it dips a filter material into a treating liquid, which is constituted by dispersing **an antibacterial component composed of zinc oxide with a particle diameter of 0.05 μm or less** into an aqueous solution of an aqueous emulsion resin, and fixes the antibacterial component on the surface of the filter material by drying.

2. The method for manufacturing an antibacterial filter material of Claim 1 characterized by the fact that as the antibacterial component, **in addition to zinc oxide, zinc pyrithione and/or zinc undecylenate with a particle diameter of 1 μm or less are used.**

Detailed explanation of the invention

[0001]

Industrial application field

The present invention pertains to a method for manufacturing a filter material for retaining a long-term antibacterial effect, that is, a method for manufacturing an antibacterial filter material used in air filters, such as for air conditioners, made of synthetic fiber, fabric, nonwoven fabric, synthetic resin molded product, etc.

[0002]

Prior art

As a conventional filter material for imparting an antibacterial property, for example, a filter material in which an organic sterilizer such as chlorohexidine group, organosilicon quaternary ammonium group, and quaternary ammonium group is spread on the surface, a filter material in which metallic copper is woven in the fibers, a filter material on which metallic silver is vapor-deposited, a filter material in which an inorganic group sterilizer such as zeolite containing silver and copper ions and apatite powder is mixed, etc., are mentioned.

[0003]

Problem to be solved by the invention

However, in the conventional filter materials, for example, the filter material on which an organic sterilizer was spread, the retention of the antibacterial activity was deficient, and in the filter material in which copper or silver fibers were kneaded, since the metal exhibiting the antibacterial property was difficult to ionize, the effect was very small and could be used only for specific uses. The objective of the present invention is to solve the problems of the above-mentioned prior art. In other words, its objective is to provide a method for manufacturing a filter material which retains a long-term antibacterial property, offers excellent workability and storage stability, does not harm the human body, and also has excellent protection against harming the environment.

[0004]

Means to solve the problem

These inventors conducted earnest research, and as a result, it was discovered that the conventional problems could be solved by fixing a zinc pyrithione and/or a zinc undecylenate with a specific particle diameter as an antibacterial component as needed on the surface of the filter material. Then, the present invention was completed. In other words, the present invention a method for manufacturing an antibacterial filter material is characterized by the fact that it dips a filter material into a

treating liquid, which is constituted by dispersing an antibacterial component composed of zinc oxide with a particle diameter of 0.05 μm or less into an aqueous solution of an aqueous emulsion resin, and fixes the antibacterial component on the surface of the filter material by drying. The zinc oxide of the inorganic group sterilizer as an antibacterial component used in the present invention must have a particle diameter of 0.05 μm or less. If the particle diameter is more than 0.05 μm, the antibacterial activity is markedly lowered. In the present invention, in addition to the zinc oxide, if necessary, zinc pyrithione and/or zinc undecylenate may also be added as the antibacterial component. The particle diameter of the zinc pyrithione and/or zinc undecylenate is preferably 1 μm or less. If the particle diameter is more than 1 μm, penetration into the filter material deteriorates, and the cleaning resistance is lowered. Also, in the present invention, in addition to the above-mentioned antibacterial component, a mineral micropowder such as titanium oxide may be mixed as a component for increasing the amount for dispersion, and when a fungicide is required, a fungicide component such as thiapentazole may be added.

[0005]

As the aqueous emulsion resin being used in the present invention, there is no special limitation. However, in case a filter base material made of glass fibers or polyester resin is used, preferably, a polyethylene terephthalate resin is used for the core, terminated by an isophthalosulfonic acid or sodium isophthalic sulfonate. Similarly, a water-soluble polyester resin with an average molecular weight of 10,000-20,000, terminated by

a parastyrenesulfonic acid or sodium parastyrene sulfonate is preferable. Also, when a filter base material made of a polypropylene resin or vinyl chloride resin is used, an aqueous emulsion resin having polypropylene as a core and terminated by chlorosulfinic acid or sodium chlorosulfonate is preferable.

[0006]

The treating liquid of the present invention is prepared by dispersing an antibacterial component into water using a sand mill, etc., adding an aqueous emulsion resin, adding an anionic or nonionic surfactant as a dispersant as needed, and uniformly dispersing it. The content of the antibacterial component and the aqueous emulsion resin in the treating liquid of the present invention is not specially limited. However, preferably, the zinc oxide is 0.01-10 wt%, the zinc pyrithione and/or zinc undecylenate is 0.005-5 wt%, or the aqueous emulsion resin (solid) fraction is 10 wt%. The antibacterial filter material of the present invention is manufactured by dipping a filter material into the above-mentioned treating liquid of the present invention and fixing an antibacterial component on the surface of the filter material by drying.

[0007]

Application examples

Application Example 1

20 g zinc oxide micropowder (purity: 99.9%, average particle diameter: 0.020 μm) were dispersed for 45 min into 78 g aqueous solution, to which 1 g each of anionic dispersant, octylphenol, and ethylene oxide benzyl ether was added, using a sand mill, and 20 parts said solution were added to 80 parts water-soluble polyester resin (Baironal[transliteration] MD-1200 made by Toyobo Co., Ltd.) and dispersed for 20 min the sand mill, so that a treating liquid of the present invention was formed. The filter base material made of glass fibers was dipped into the treating liquid, squeezed with a mangle to reduce the area 75%, and dried at 160°C for 20 min, so that an antibacterial filter material (A-1) of the present invention was obtained. The antibacterial filter material (A-1) of the present invention, a comparative filter material (H-1), in which the zinc micropowder was replaced with zinc oxide (purity: 99.9%, average particle diameter: 1 μm) and similarly treated, and an untreated glass fiber filter material (C-1) were tested by a method for measuring the number of bacteria (Fiber Product Hygiene Processing Association). As a result, as shown in Table I, the filter material of the present invention exhibited an excellent antibacterial property. The comparative filter material seldom exhibited the effect.

[0008]

Table I

Application Example 1: Results

① 濾過材		② 生菌数値	③ 増減値	④ 増減値差
	⑤ 植菌数	4×10^{6} log 5.6	*	*
C－1	⑥ 無加工	2×10^{8} log 8.3	2．7	*
A－1	⑦ 実施例	2×10^{3} log 3.3	－2．3	5．0
H－1	⑧ 比較例	2×10^{8} log 8.3	2．7	0

Key: 1 Filter material
2 Number of live bacteria
3 Increased and decreased value
4 Difference between the increase and decrease values
5 Number of bacteria inoculated
6 Untreated
7 Application example
8 Comparative example

[0009]

Application Example 2

20 g zinc oxide micropowder (purity: 99.9%, average particle diameter: 0.02 μm) and 2 g zinc pyrithione (average particle diameter of 0.7 μm) were dispersed for 30 min into 75.50 g of an aqueous solution, to which 2 g nonionic surfactant (Primal 850 made by Rohm & Haas Co.) and 0.5 g polyethylene glycol nonylphenyl ether were added, by a sand mill, and 20 parts said solution (B-1 solution) were added to 80 parts water-soluble polyester resin (PE-20 made by Futaba Fine Chemical K.K.) and dispersed for 20 min the sand mill, so that a treating liquid of the present invention was formed. The filter base material made of glass fibers was dipped into the treating liquid, squeezed with a mangle to reduce area 70%, dried at 100°C for 20 min, and cured at 160°C for 1 min, so that an antibacterial filter material (A-2) of the present invention was obtained. The antibacterial filter material (A-2) of the present invention, a comparative filter material (H-2), in which 20 parts B-1 solution were added to 80 parts water and similarly dispersed for 20 min using the sand mill, and an untreated glass fiber filter material

(C-1) were repeatedly cleaned 30 times by method 103 of JIS L 0217. These analytes were tested by the method for measuring the number of bacteria (Fiber Product Hygiene Processing Association). As a result, as shown in Table II, the filter material of the present invention exhibited an excellent antibacterial property. The comparative filter material seldom exhibited the effect.

[0010]

Table II

Application Example 2: Results

①濾過材		②生菌数値	③増減値	④増減値差
	⑤植菌数	4×10^{5} log 5.6	*	*
C－1	⑥無加工	2×10^{8} log 8.3	2．7	*
A－2	⑦実施例	7×10^{3} log 3.8	－1．8	4．5
H－2	⑧比較例	1×10^{7} log 7.0	1．4	1．3

Key: 1 Filter material
2 Number of live bacteria
3 Increased and decreased value
4 Difference between the increase and decrease values
5 Number of bacteria inoculated
6 Untreated
7 Application example
8 Comparative example

[0011]

Application Example 3

15 g zinc oxide micropowder (purity: 99.9%, average particle diameter: 0.020 μm), 5 g zinc titanium micropowder (average particle diameter: 0.050 μm), and 3 g zinc undecylenate (average particle diameter: 0.8 μm) were dispersed for 30 min into 74.50 g aqueous solution, to which 2 g anionic surfactant (Primal 850 made by Rohm & Haas Co.) and 0.5 g polyethylene glycol nonylphenyl ether were added, by a sand mill, and 20 parts said solution (B-2 solution) were added to 80 parts water-soluble polyester resin (PE-20 made by Futaba Fine Chemical K.K.) and dispersed for 20 min by the sand mill, so that a treating liquid of the present invention was formed. The filter base material made of glass fibers was dipped into the treating liquid, squeezed at a reduction rate of area of 70% by a mangle, dried at 100°C for 20 min, and cured at 150°C for 2 min, so that an antibacterial filter material (A-3) of the present invention was obtained. The antibacterial filter material (A-3) of the present invention, a comparative filter material (H-2), in which 20 parts B-2 solution was added to 80 parts water and similarly dispersed

for 20 min by the sand mill, and an untreated glass fiber filter material (C-1) were repeatedly cleaned 30 times by 103 method of JIS L 0217. These analytes were tested by the method for measuring the number of bacteria (Fiber Product Hygiene Processing Association). As a result, as shown in Table III, the filter material of the present invention exhibited an excellent antibacterial property. The comparative filter material seldom exhibited the effect.

[0012]

Table III

Application Example 3: Results

① 濾過材		② 生菌数値	③ 増減値	④ 増減値差
	⑤ 植菌数	6×10^{6} log 5.8	*	*
C－1	⑥ 無加工	1×10^{8} log 8.0	2．2	*
A－3	⑦ 実施例	1×10^{4} log 4.0	－1．8	4．0
H－2	⑧ 比較例	1×10^{7} log 7.0	1．2	1．0

Key: 1 Filter material
2 Number of live bacteria
3 Increased and decreased value

4 Difference between the increase and decrease values
5 Number of planted bacteria
6 Untreated
7 Application example
8 Comparative example

[0011]

Application Example 4

20 g zinc oxide micropowder (purity: 99.9%, average particle diameter: 0.020 μm) and 2 g zinc pyrithione were dispersed for 30 min into 75.50 g of an aqueous solution, to which 2 g nonionic surfactant (Primal 850 made by Rohm & Haas Co.) and 0.5 g polyethylene glycol nonylphenyl ether were added, using a sand mill, and 20 parts said solution (B-3 solution) were added to 80 parts 30% propylene chlorosulfonated propylene resin (Hardren[transliteration] E-10 made by Toyo Kasei K.K.) and dispersed for 20 min using the sand mill, so that a treating liquid of the present invention was formed. The filter base material made of glass fibers was dipped into the treating liquid, squeezed with a mangle to reduce the area 70%, dried at 100°C for 15 min, and cured at 110°C for 1 min, so that an antibacterial filter material (A-4) of the present invention was obtained. The antibacterial filter material (A-4) of the present invention, a comparative filter material (H-2), in which 20 parts B-3 solution were added to 80 parts water and similarly dispersed for 20 min using the sand mill, and an untreated glass fiber filter material (C-1) were repeatedly cleaned 30 times by method 103 of JIS L 0217. These analytes were tested by the method for measuring the number of bacteria (Fiber Product Hygiene

Processing Association). As a result, as shown in Table IV, the filter material of the present invention exhibited an excellent antibacterial property. The comparative filter material seldom exhibited the effect.

[0014]

Table IV

Application Example 4: Results

①濾過材		②生菌数値	③増減値	④増減値差
	⑤植菌数	8×10^{5} log 5.9	*	*
C－1	⑩無加工	2×10^{6} log 8.3	2．4	*
A－4	⑦実施例	7×10^{2} log 2.8	－3．1	5．5
H－2	⑨比較例	2×10^{7} log 7.3	1．4	1．0

Key: 1 Filter material
2 Number of live bacteria
3 Increased and decreased value
4 Difference between the increase and decrease values
5 Number of bacteria inoculated
6 Untreated
7 Application example
8 Comparative example

[0015]

Effect of the invention

An antibacterial filter material with antibacterial performance superior to that of conventional materials can be obtained by manufacturing the filter material of the present invention. Also, the antibacterial filter material has antibacterial property even after washing with water in addition to the antibacterial property during general filtration, can be reused in terms of application such as air filter utilization, and is also economically excellent.

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(54)【発明の名称】　抗菌性濾過材の製造方法

(57)【要約】

【構成】　水性エマルション樹脂の水溶液に粒子径０．０５μｍ以下の酸化亜鉛からなる抗菌成分を分散させてなる処理液に濾過材を浸漬し、その後乾燥させることにより、濾過材の表面に抗菌成分を固着させることを特徴とする抗菌性濾過材の製造方法。

【効果】　本発明による濾過材の製造を行う事によって、従来のものより優れた抗菌性能を有する抗菌濾過材を得ることができる。またこの抗菌濾過材は一般の濾過時の抗菌性に加えて、水洗後も抗菌性を有しエアフィルター利用等の応用面で再使用でき経済的にも優れる。

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【特許請求の範囲】

【請求項１】　水性エマルション樹脂の水溶液に粒子径０．０５μｍ以下の酸化亜鉛からなる抗菌成分を分散させてなる処理液に濾過材を浸漬し、その後乾燥させることにより、濾過材の表面に抗菌成分を固着させることを特徴とする抗菌性濾過材の製造方法。

【請求項２】　抗菌成分として酸化亜鉛に加えて粒子径１μｍ以下のジンクピリチオン及び／又はウンデシレン酸亜鉛を用いることを、特徴とする請求項１記載の抗菌性濾過材の製造方法。

【発明の詳細な説明】

【０００１】

【産業上の利用分野】本発明は長期間抗菌効果を持続する濾過材の製造方法、即ち合成繊維、布、不織布及び合成樹脂成形品等で造られた空調器などのエアーフィルター等に使用される抗菌性濾過材の製造方法に関する。

【０００２】

【従来の技術】従来から抗菌性を持たせた濾過材としては、例えばクロルヘキシジン系、有機シリコン第４級アンモニュウム系、第４級アンモニュウム系の様な有機殺菌剤を濾過材の表面に塗布したもの、金属銅を繊維に織り込んだもの、金属銀を蒸着したもの、あるいは銀、銅イオンを含有したゼオライトやアパタイトの粉末等の無機系殺菌剤を濾過材中に混入したもの等が提示されている。

【０００３】

【発明が解決しようとする課題】しかしながら従来の濾過材は、例えば有機殺菌剤を塗布させたものは抗菌作用の持続が乏しく、また銅、銀等の繊維を練り込んだものは抗菌性を示す金属がイオン化する状態になり難いため、効力が非常に小さく特定の用途以外は実用化できない等の欠点があった。本発明の目的は、前記のような従来の技術の問題点を解決することである。即ち無機系殺菌剤の抗菌成分の持つ効力を充分発揮させる，長期間抗菌性を持続させる，優れた加工性、保存安定性をもたせる，人体に対して害がなく、環境への安全性にも優れる等の特性を有する濾過材の製造方法を提供することである。

【０００４】

【課題を解決するための手段】発明者らは鋭意検討した結果、特定粒子径の酸化亜鉛および必要に応じてジンクピリチオン及び／又はウンデシレン酸亜鉛を抗菌成分として濾過材表面に固着させることにより従来の問題点が解決できることを見出し本発明を完成したものである。すなわち、本発明は水性エマルション樹脂の水溶液に粒子径０．０５μｍ以下の酸化亜鉛からなる抗菌成を分散させてなる処理液に濾過材を浸漬し、その後乾燥させることにより、濾過材の表面に抗菌成分を固着させることを特徴とする抗菌性濾過材の製造方法である。本発明に用いられる抗菌成分としての無機系殺菌剤の酸化亜鉛は粒子径が０．０５μｍ以下でなければならない。粒子径が０．０５μｍを超えると抗菌活性が著しく低下する。本発明においては酸化亜鉛の他に必要に応じて抗菌成分としてジンクピリチオン及び／又はウンデシレン酸亜鉛を加えてもよい。ジンクピリチオン及び／又はウンデシレン酸亜鉛の粒子径は１μｍ以下のものが好ましく、粒子径が１μｍを超えるものを使用すると、濾過材への浸透が悪くなり、耐洗濯性が低下する。また本発明においては、前記抗菌成分の他に、分散用増量成分として酸化チタン等鉱物微粉末等を混合する事や防カビ性が必要なときはチアベンダゾール等の防カビ成分を加えることを妨げるものではない。

【０００５】本発明に用いられる水性エマルション樹脂としては、特に制限されるものでないが、ガラス繊維、またはポリエステル樹脂製の濾過基材を用いる場合は、望ましくはポリエチレンテレフタレート樹脂を骨格とし、末端にイソフタル酸スルホン酸０はイソフタル酸スルホン酸ナトリウムを持つもの、同じく末端にパラスチレン・スルホン酸またはパラスチレン・スルホン酸ナトリウムを持つ平均分子量１００００から２００００の水溶性ポリエステル樹脂が好ましい。またポリプロピレン樹脂や塩化ビニル樹脂製の濾過基材を用いるときはポリプロピレンを骨格とし、末端にクロルスルフォン酸又はクロルスルホン酸ナトリウムを持つ水性エマルション樹脂が好ましい。

【０００６】本発明の処理液は、抗菌成分を水中にサンドミル等で分散させ更に水性エマルション樹脂を加え必要により分散剤としてアニオン系、あるいはノニオン系の界面活性剤を加え、均一に分散して調製される。本発明の処理液中の抗菌成分および水性エマルション樹脂の含有量は特に制限はされないが酸化亜鉛は０．０１～１０重量%、ジンクピリチオン及び／又はウンデシレン酸亜鉛は０．００５～５重量%、また水性エマルション樹脂（固形）分は１０重量%以下であることが好ましい。本発明の抗菌性濾過材は、前記発明の処理液中に濾過材を浸漬し、その後乾燥させ、濾過材の表面に抗菌成分を固着させることにより製造される。

【０００７】

【実施例】

実施例１

酸化亜鉛微粉末（純度：９９．９%、平均粒子径：０．０２０μｍ）を２０ｇ、アニオン系分散剤、及びオクチルフェノール及びエチレンオキサイドベンジルエーテル各１ｇを加えた水溶液７８ｇ中にサンドミルを用いて４５分間分散し、この液を２０部を取り水溶性ポリエステル樹脂（バイロナールＭＤ-１２００：東洋紡績（株）製）８０部に加えサンドミルで２０分間分散し本発明処理液とした。この処理液内にガラス繊維製濾過基材を漬け込みマングルで絞り率７５%で絞った後、１６０℃２０分乾燥処理し本発明による抗菌性濾過材（Ａ-１）を

得た。本発明抗菌性濾過材（A-1）と酸化亜鉛微粉末を酸化亜鉛（純度：９９．９%、平均粒子径：１μm）に置き換え同様に処理した比較濾過材（H-1）及び無処理ガラス繊維濾基材（C-1）を、菌数測定法（繊維製品衛生加工協議会）を用いて試験を行った結果、表１に示すように本発明による濾過材は優れた抗菌性を示した。比較濾過材はほとんど効果を示さなかった。

【０００８】

【表１】

実施例１結果

濾過材		生菌数値	増減値	増減値差
	植菌数	4×10^5 log 5.6	*	*
C－1	無加工	2×10^8 log 8.3	2．7	*
A－1	実施例	2×10^3 log 3.3	－2．3	5．0
H－1	比較例	2×10^8 log 8.3	2．7	0

【０００９】実施例２

酸化亜鉛微粉末（純度：９９．９%、平均粒子径０．０２μm）を２０g、ジンクピリチオン（平均粒子径０．７μm）２gをノニオン系界面活性剤（ロームアンドハース社製プライマル８５０）２g、及びポリエチレングリコールノニルフェニールエーテル０．５gを加えた水溶液７５．５０g中にサンドミルを用いて３０分間分散しこの液（B-1液）を２０部取り水溶性ポリエステル樹脂（ＰＥ-２０：フタバファインケミカル（株）製）８０部に加えサンドミルで２０分間分散し本発明処理液とした。この処理液内にガラス繊維製濾過基材を漬け込みマングルで絞り率７０%で絞った後、１００℃２０分乾燥処理し１６０℃１分キュアし、本発明による抗菌性濾過材（A-2）を得た。本発明抗菌性濾過材（A-2）とB-1液２０部を水８０部に加えてサンドミルで２０分間同様に分散した液を用い処理した比較濾過材（H-2）及び無処理ガラス繊維濾基材（C-1）を、ＪＩＳ　Ｌ　０２１７の１０３法により、３０回繰り返し洗濯後検体とし、菌数測定法（繊維製品衛生加工協議会）を用いて試験を行った結果、表２に示すように本発明による濾過材は優れた抗菌性を示した。比較濾過材はほとんど効果を示さなかった。

【００１０】

【表２】

実施例2結果

濾過材		生菌数値	増減値	増減値差
	植菌数	4×10^5 log 5.6	*	*
C－1	無加工	2×10^8 log 8.3	2．7	*
A－2	実施例	7×10^3 log 3.8	－1．8	4．5
H－2	比較例	1×10^7 log 7.0	1．4	1．3

【００１１】実施例３
酸化亜鉛微粉末（純度：９９．９%、平均粒子径：０．０２０μm）を１５g、酸化チタン微粉末（平均粒子径：０，０５０μm）を５g、ウンデシレン酸亜鉛（平均粒子径０．８μm）３gを、アニオン系界面活性剤（ロームアンドハース社製ブライマル８５０）２g、及びポリエチレングリコールノニルフェニールエーテル０．５gを加えた水溶液７４．５０g中にサンドミルを用いて３０分間分散しこの液（B-2液）を２０部取り水溶性ポリエステル樹脂（PE-２０：フタバファインケミカル（株）製）８０部に加えサンドミルで２０分間分散し本発明処理液とした。この処理液内にガラス繊維製濾過基材漬け込みマングルで絞り率７０%で絞った後、１００℃２０分乾燥処理し１５０℃２分キュアし本発明抗菌性濾過材（A-３）を得た。本発明抗菌性濾過材（A-３）とB-２液２０部を水８０部に加えてサンドミルで２０分間同様に分散した液を用い処理した比較濾過材（H-２）及び無処理ガラス繊維濾基材（C-１）を、ＪＩＳ　Ｌ　０２１７の１０３法により、３０回繰り返し洗濯後検体とし、菌数測定法（繊維製品衛生加工協議会）を用いて試験を行った結果、表３に示すように本発明による濾過材は優れた抗菌性を示した。比較濾過材はほとんど効果を示さなかった。
【００１２】
【表３】

実施例3結果

濾過材		生菌数値	増減値	増減値差
	植菌数	6×10^{6} log 5.8	*	*
C－1	無加工	1×10^{8} log 8.0	2．2	*
A－3	実施例	1×10^{4} log 4.0	－1．8	4．0
H－2	比較例	1×10^{7} log 7.0	1．2	1．0

【００１３】実施例４
酸化亜鉛微粉末（純度：９９．９%、平均粒子径０．０２０μm）を２０g、ジンクピリチオン２gをノニオン系界面活性剤（ロームアンドハース社製、ブライマル８５０）２g、及びポリエチレングリコールノニルフェニールエーテル０．５gを加えた水溶液７５．５０g中にサンドミルを用いて３０分間分散しこの液（B－３液）を２０部取りクロルスルフォン化ポリプロピレン樹脂（ハードレンE－１０１：東洋化成工業（株）製）３０%液８０部に加えサンドミルで２０分間分散し本発明処理液とした。この処理液内にポリプロピレン繊維製濾過基材を漬け込みマングルで絞り率７０%で絞った後、１００℃１５分乾燥処理し１１０℃１分キュアし、本発明抗菌性濾過材（A－４）を得た。本発明抗菌性濾過材（A－４）とB－３液２０部を水８０部に加えてサンドミルで２０分間同様に分散した液を用い処理した比較濾過材（H－２）及び無処理ポリプロピレン繊維濾基材（C－１）を、ＪＩＳ　Ｌ　０２１７の１０３法により、３０回繰り返し洗濯後検体とし、菌数測定法（繊維製品衛生加工協議会）を用いて試験を行った結果、表４に示すように本発明による濾過材は優れた抗菌性を示した。比較濾過材はほとんど効果を示さなかった。
【００１４】
【表４】

実施例4結果

濾過材		生菌数値	増減値	増減値差
	植菌数	8×10^5 log 5.9	*	*
C－1	無加工	2×10^8 log 8.3	2．4	*
A－4	実施例	7×10^2 log 2.8	－3．1	5．5
H－2	比較例	2×10^7 log 7.3	1．4	1．0

【００１５】

【発明の効果】本発明による濾過材の製造を行う事によって、従来のものより優れた抗菌性能を有する抗菌濾過材を得ることができる。またこの抗菌濾過材は一般の濾過時の抗菌性に加えて、水洗後も抗菌性を有しエアフィルター利用等の応用面で再使用でき経済的にも優れる。